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LARVA AND PUPA OF AN AUSTRALIAN LIMNEPHILID (TRICHOPTERA)

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Abstract

The larva and pupa of *Archaeophylax ochreus* Mosely, the only known species of the family Limnephilidae, is described and figured. A short account of the habitat is also given. This species is recorded for the first time in Victoria.

Introduction

The discovery of the larva and pupa of *Archaeophylax ochreus* Mosely is of particular interest, because as far as is known, it is the only species of the family Limnephilidae represented in Australia. Originally this species was known from Tasmania and New South Wales, indicating that it might also be found in Victorian mountain streams. When collecting on Bogong High Plains in north-eastern Victoria, January to March 1957, the author was successful in not only obtaining adult specimens, but also in correlating larval and pupal stages with the adults, and learning more about the type of streams in which they live.

Habitat

Adult specimens were found near streams only above 4,800 ft., indicating their partiality to temperate climatic conditions. This altitude is near the tree line in the Victorian Alps, and most specimens were collected in open forest areas (Pl. XXVI, fig. 2), whereas no specimens were collected in dense scrub. Larvae were found in calm pools of otherwise rapidly flowing small, stony streams with partly sandy beds. They live under stones in small or large groups (Pl. XXVI, fig. 1); when fully grown they attach their cases to the under surfaces of stones, and partially seal the case openings before pupating.

During the last two weeks in January 1957 large areas of snow still remained on the higher altitudes in the Hotham-Bogong district, in spite of the day temperatures rising up to 24° C. The melting snow kept water temperature in streams down to 14° or 15° C., apparently below the average for the same time in other years, thus slowing the emergence of adults. At this time only larvae, with the exception of few pupae, were collected. Mosely and Kimmins (1953) gave January 1 and 27 as collecting dates for specimens from Mt. Kosciusko district only about fify miles away. The author, when collecting in Hotham-Bogong district between March 20 and 30, obtained a number of adults, but on searching the breeding grounds discovered that most of the cases contained pupae about to emerge. However, only a small number had fully grown larvae, or were empty; the latter indicated that emergence had started only shortly before and that most adults would be emerging within the following two weeks, therefore being about two months later than earlier records. At this time the water temperature had risen to 19° or 20° C. and all snow from higher altitudes had disappeared. The above observations demonstrated the important effect of seasonal weather conditions on the time of emergence of mountain caddis flies in Victoria.

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Description

Case. Cylindrical, straight or slightly bent, consists of small pebbles 2 to 4 mm. in diameter, placed without any definite arrangement. Two larval cases are known to the author consisting of vegetable debris, cut in small pieces of approximately the same size as the pebbles used by other specimens. Posterior end only slightly narrowed. Inside covered with fine silken lining. When pupating, both ends of the case are partially sealed leaving a small irregular opening. Length up to 22 mm.; width up to 7 mm.

Larva. Eruciform, cylindrical, head orthocentrous. Pronotum sclerotized, mesonotum with sclerotized central portion, metanotum with small sclerotized patches. Length up to 21 mm.

Head elongate, sparsely covered with bristles as shown in Fig. 1; almost uniformly yellowish brown with the exception of a paler triangular marking at the centre of clypeus slightly above the eyes, and two irregular patches at the widening part of clypeus. Irregular pattern of oval spots are on the aboral part of genae and the narrow part of clypeus. Eyes distinct in light coloured areas. Antennae short, located a short distance below the eyes. Gular sclerite (Fig. 2) pointed aborally. Mandibles black, broad with four blunt teeth on the apical margin, a brush of bristles located at center of inner margin, and two bristles at the exterior aboral margin.

Thorax (Fig. 5). Pronotum sclerotized, yellowish brown, posterior margin dark brown, median line paler, bristles arranged along the anterior margin and again across the middle of pronotum. Mesonotum sclerotized in its central portion only, sclerotized part with darker posterior margin and two dark unequal sized patches laterally, median line pale, comparatively wide. Metanotum with sclerotized patches, each bearing few bristles. Prosternal horn present.

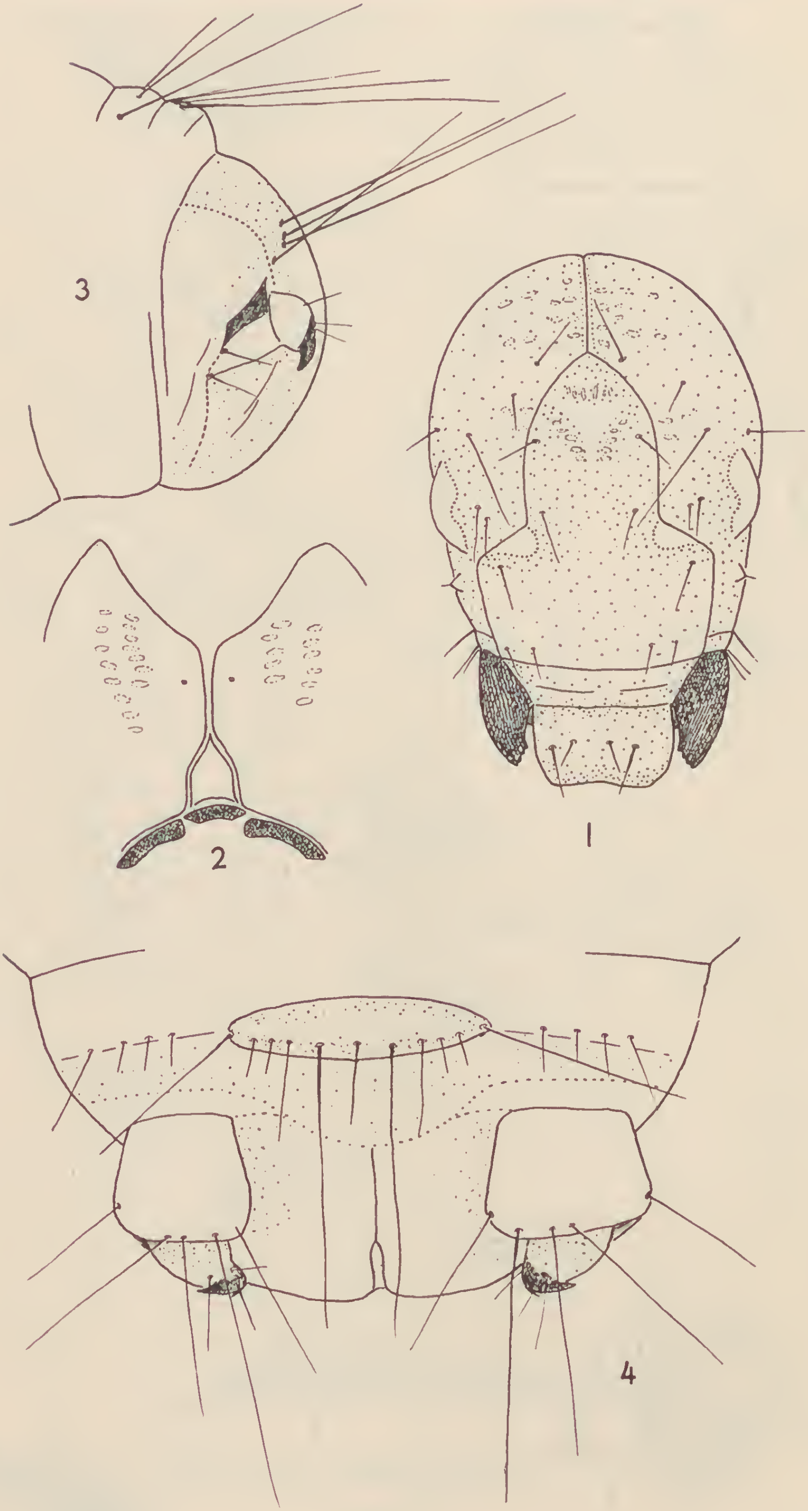
Prothoracic legs (Fig. 10) slightly shorter than the meso- and metathoracic legs; coxa and femur thickened, the latter with a row of scattered bristles along the dorsal edge, tibia with short spines along the ventral edge, the distal one being the longest. Meso- and metathoracic legs (Figs. 11 and 12) very similar except that the mesothoracic legs are more robust.

Abdomen cylindrical, pale yellow or whitish, segments separated by shallow indistinct grooves. Lateral line extends from third to eighth segment. A pair of lateral protuberances on first abdominal segment; dorsal protuberance absent. Ninth abdominal segment with elongate oval sclerite on which a row of bristles is located along the posterior margin, four of the bristles being longer and more distinct, the shorter ones are grouped between as shown in Fig. 4. Anal claws with an additional hook. Gills arranged in large groups on anterior segments, decreasing in size and number towards posterior end of abdomen.

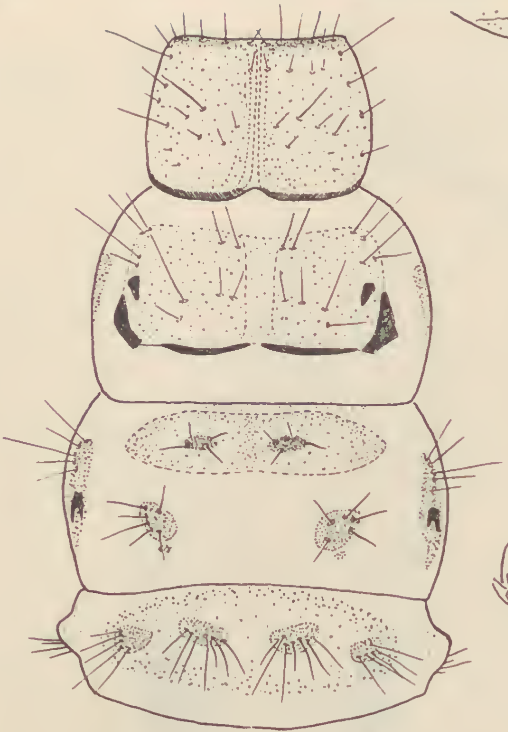
Pupa. Pale yellowish, ninth segment darker, anal processes yellowish brown. Length up to 20 mm., male pupae usually smaller.

Head sparsely covered with erect bristles arranged as follows: two between the antennae, four in centre of forehead, two on each side between clypeus and eye, four pairs on clypeus. A tuft of bristles at the base of each antenna just above the eye, one to three separate bristles on dorsal side of first antennal segment, and a tuft of bristles on the second segment. Mandibles (Fig. 13) strong, somewhat triangular, pointed, with a pair of unequal sized bristles near the base. Antennae are normally kept parallel to the body, and extend posteriorly as far as seventh to ninth segment.

Thorax. Pronotum with two pairs of fine bristles, mesonotum with three pairs, metanotum with three pairs of bristles as well as a pair of sclerotized patches on the pasterior margin.



Figs. 1-4



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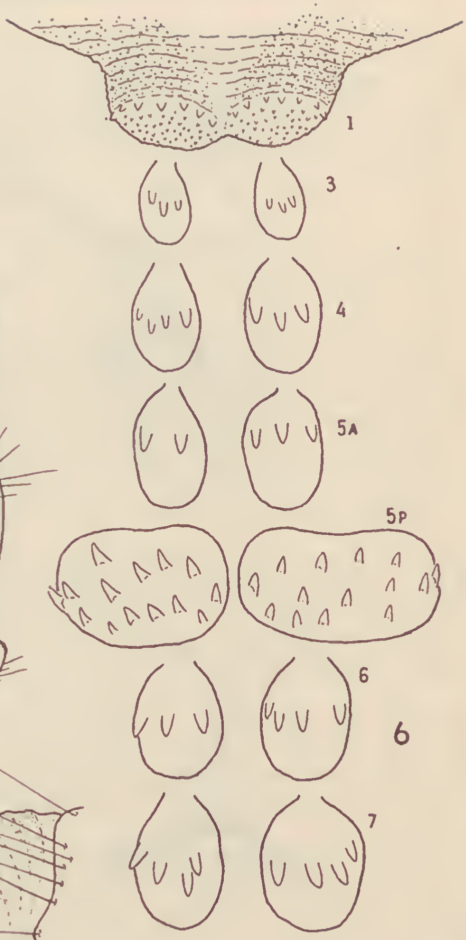

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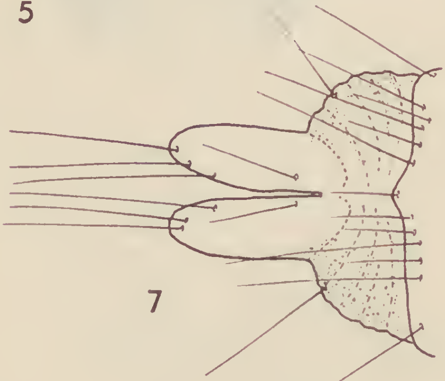

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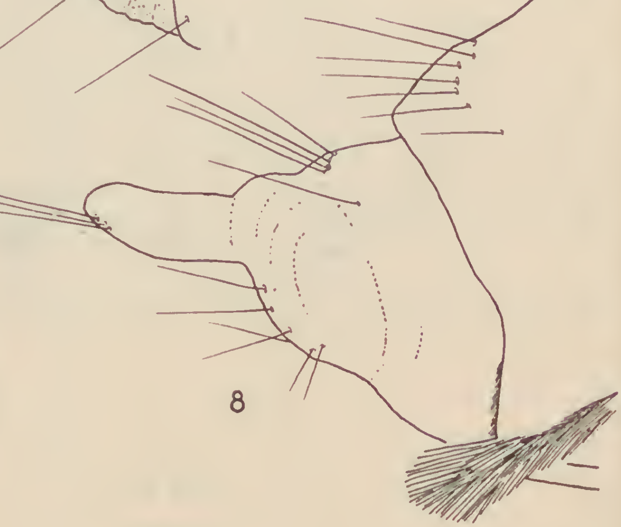

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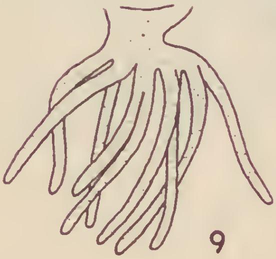

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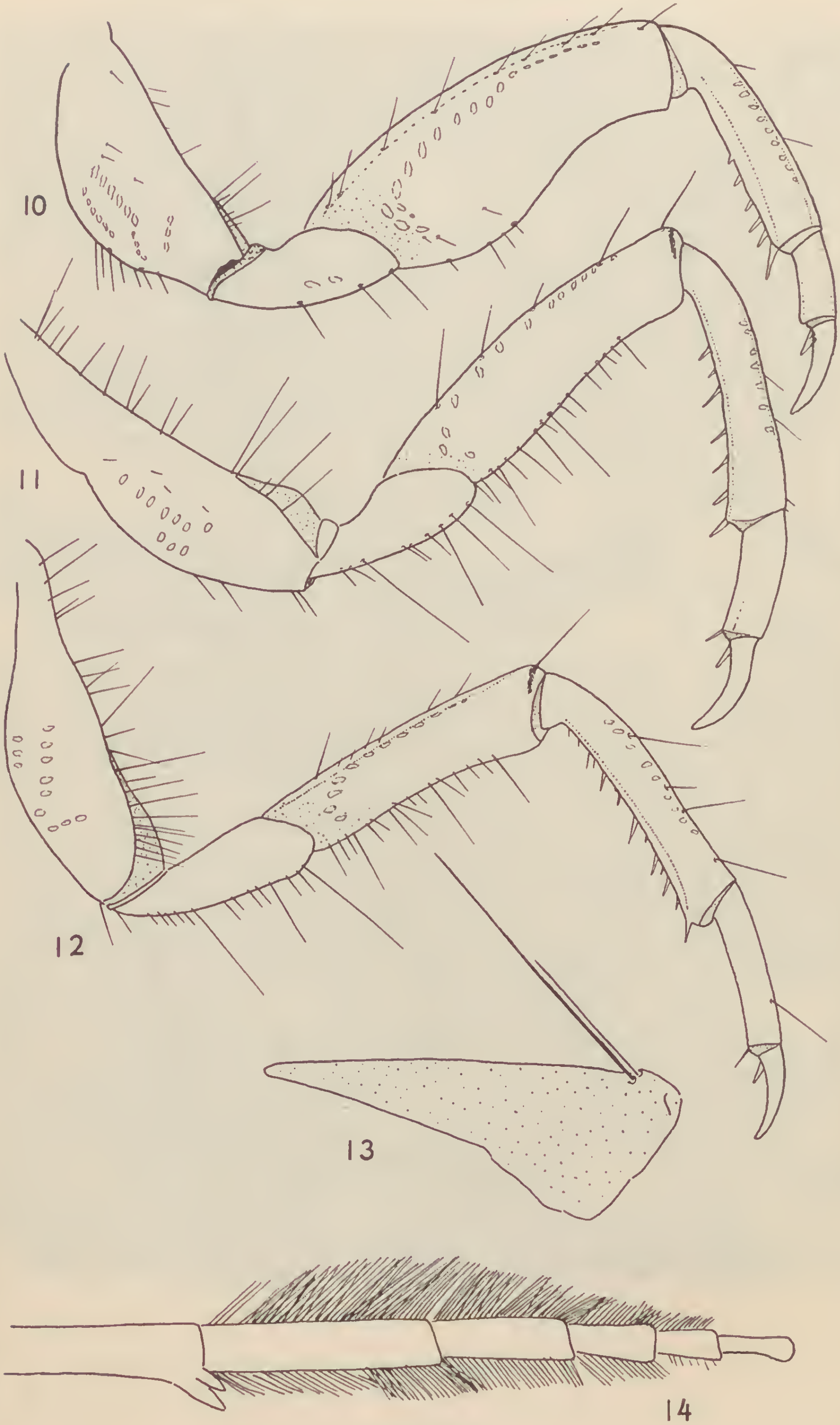
FIGS. 5-9



Figs. 10-14

Coxae of prothoracic and mesothoracic legs with patch of bristles. Tarsal joints of mesothoracic legs (Fig. 14) covered on both sides with a row of swimming hairs. Metathoracic legs simple.

Abdomen somewhat cylindrical, sixth and seventh segment being the widest. First segment with sclerotized dorsal plate, elevated posteriorly and ending in a bilobed hook plate (Fig. 6 (1)). Second segment without any kind of hook plates; third to seventh segments with flat hook plates as shown in Fig. 6; fifth segment with two pairs—anterior pair (5A) with two to four hooks directed posteriorly, and posterior pair (5P) with irregularly distributed hooks directed anteriorly. A pair of fine yellowish brown longitudinal lines on dorsal surface of second to eight segments. Lateral line begins at the middle of fourth segment, continues towards the eight segment where both lateral lines almost join on the ventral surface.

Dorsal gills on second to fifth segments; those of anterior segments in larger groups, the posterior ones in groups to two or three. Ventral gills on second to seventh segment; first and last pairs in groups to two or three, others larger.

Male and female sexes are separable in pupae. Just ventral to the anal processes in the male some details of external genitalia are indicated by two lateral lobes and an oval median swelling. The same area ventral to the anal processes in females does not show any such details.

Material Examined

Falls Creek Ski Village, 4,900 ft., 26 March 1957 (adults only); Mt. McKay area, 5,500 ft., 26 March 1957 (adults, larvae and pupae); Mt. Hotham area (Whisky Flat), 5,200 ft., 1 February 1957 (larvae and pupae); 27 March 1957 (also adults).

Larva and pupa described from specimens collected near Mt. McKay, now in the National Museum of Victoria collection; other specimens in C.S.I.R.O. Division of Entomology collection at Canberra, and National Museum of Victoria.

Reference

Mosely, M. E., and Kimmins, D. E., 1953. *The Trichoptera of Australia and New Zealand.* (British Museum, London.)

Explanation of Figures

Fig. 1.—Larval head from front.
Fig. 2.—Gular sclerite.
Fig. 3.—Posterior abdominal segment lateral.
Fig. 4.—Posterior abdominal segment dorsal.

Fig. 5.—Thoracic and first abdominal segments of larva, dorsal.
Fig. 6.—Pupal hook plates, numbers indicating abdominal segments.
Fig. 7.—Apical processes of pupa dorsal.
Fig. 8.—Apical processes of pupa lateral.
Fig. 9.—Dorsal gill of pupa.

Fig. 10.—Prothoracic leg of larva.
Fig. 11.—Mesothoracic leg of larva.
Fig. 12.—Metathoracic leg of larva.
Fig. 13.—Mandible of pupa.
Fig. 14.—Tarsal joints of pupal mesothoracic leg with swimming hairs.

Explanation of Plate

Plate XXVI

(Photographs by the author)

Fig. 1.—Group of cases on the underside of a stone.
Fig. 2.—Stream at Hotham Heights; calm water pool in foreground.